problem to be investigated onwards. The author's writing is circumstantial, sometimes to the point of being involved, so that in spite of its literary flavour it does not make easy reading. The book has, however, the outstanding merit that all the data are given, so that a research worker unfamiliar with any of the methods would be able to find here all the relevant details, frequently illustrated by interesting examples from practical experience.

It is to be regretted that the modern advances, made principally in England, in statistics, particularly in the treatment of small samples, are not well known in Germany. In England we are well supplied with mathematicians, but suffer from a paucity of practical and field workers. In Germany the reverse is the case. Psychiatry and this branch of applied mathematics being as specialized subjects as they are, it is scarcely possible to find a worker who is sufficiently a master in both fields to inspire the confidence of others. It is a pity that the famous Munich Forschungsanstalt, from which this work proceeds, has not found room in the ranks of its workers for a properly qualified mathematician. In England our mathematicians are working out for us new methods of attack, for instance, on the possibility of discovering linkages, but we have not the workers to gather the material. While there still remains an immense amount of work to be done along the old lines, it is largely in the form of filling in gaps. The Rüdin school has been responsible for the large and invaluable collection of data, which is called in Germany empirical hereditary prognostics. Further advance in this direction of fundamental importance does not seem to be likely. The total results of twin and family studies are inevitably to some extent inconclusive, and cannot lead us to the isolation of definite factors, which must be the final aim of psychiatric genetics. For this will be required the closest co-operation between mathematicians, psychiatrists and biological geneticists.

ELIOT SLATER.

POPULATION

Kuczynski, R. R. *Population Movements.* Oxford, 1936. The Clarendon Press. Pp. 121. Price 5s.

THE three public lectures which Dr. Kuczynski delivered at University College in March 1936 have now been published. They form a short book—only 79 of the 121 pages are text, the rest consisting of a statistical appendix—and cover a wide range of problems, yet the book is packed full of new information, presented with the clarity and calm which we have learned to expect from Dr. Kuczynski.

With so much material to handle—the growth of population in the Americas, Africa, and Oceania, recent changes in fertility and mortality, and the possibilities of increasing reproduction in the Western world—it is difficult to do justice to more than one section. But in passing it is important to note that, as a result of this new work, we now have for the continents mentioned above an analysis of population growth as definitive as any we are ever likely to obtain. Dr. Kuczynski's computations must, it is obvious, replace others previously accepted, for even those of Willcox show serious deficiencies. Our knowledge of the growth of population in Asia, however, still remains very scanty. Until quite recently, for example, it was customary to accept Professor Willcox's estimate of the population of China in 1650 at about 70 millions. But Professor Carr Saunders pointed out in his last book* that this would imply a growth hardly compatible with the economic development of the country in the last 280 years, and suggests instead Mr. Fitzgerald's estimate of about 150 millions. At the same time, Mr. Nanming I Liu, in what seems to be the most thorough analysis yet made of the development of the population of China, suggests 105 millions as a likely figure for 1660.† Even for the population at the present time the range between the different

* *World Population.* Oxford, 1936. Pp. 38-42.

† *Contribution à l'Étude de la Population Chinoise.* Bibliothèque Sino-Internationale, 1935. P. 61.

computations is over 100 millions.* With so divergent a series of estimates, a thorough review of the material would appear to be necessary, and it would be of great value to have from Dr. Kuczynski an analysis of the population of Asia similar to the one he has just completed for Africa and the Americas.

In the field of modern population problems Dr. Kuczynski is, of course, no less interesting. He points out that there is no reason to assume that up to the 1870's there had been any marked changes in fertility, apart from those temporary fluctuations induced by famines or other catastrophes. The story of the growth of fertility, for example, in England and Wales between 1800 and 1870 is probably no less a myth than that of the prevalence of " very large " families in the early- and mid-Victorian eras. Apart from the growing completeness of birth registration, and perhaps also the returning upward movement of births after the " hungry forties," the rapid population growth of the period was due very largely to the decline in mortality.

But the position has changed. There are very narrow limits to any further fall in mortality, whereas not even population campaigns seem to have given an effective check to the rapid fall in fertility. Apart from the general mechanism of that fall, we know very little about the situation. As Dr. Kuczynski shows, neither early nor universal marriage would be sufficiently compensatory to raise the net reproduction rate for Western Europe to unity. The problem for most of the Western world still remains one of declining marital fertility, and only fully comprehensive investigations are likely to tell us the real cause of this. D. V. GLASS.

POVERTY AND HEALTH

Orr, John Boyd. *Food, Health and Income.* A Report of a Survey of Adequacy of Diet in Relation to Income. London, 1936. Macmillan & Co. Pp. 72. Price 2s. 6d.

THIS book describes the findings of an investigation undertaken by the Rowett Research Institute, with the assistance of the Market Supply Committee, into the food habits of people in this country. It was published in March of this year, since when it has been the subject of keen discussion in political and other circles. The conclusions have an important bearing upon eugenics in that they bring home to us how we should be on our guard against attributing observable deficiencies in the population to genetic factors alone.

Sir John Orr has succeeded in presenting a difficult and complicated subject in an unusually lucid manner. The scope of the inquiry was enormous, and in order to establish each step in the argument, many complex calculations and much special knowledge were necessary. The book is, in fact, a highly condensed summary of an investigation the details of which would fill a volume of considerable size. It is consequently a difficult book to review adequately in a short space. Here the main conclusions only will be summarized and attention drawn to their significance for eugenists.

The investigation was carried out in four stages:

1. The total national supplies of the main food supplies were estimated.
2. To obtain an idea of the nature of the diet in different sections of the community, the whole population was classified in six groups according to family income, and an estimate based on family budget data was made of the consumption of the various foodstuffs in each of the groups.
3. The constitution of the average diet of each group was examined, the amount of each constituent present being compared with the amount required for health.
4. The state of health for the country was reviewed in order to obtain an idea of the extent to which inadequacy of diet is reflected in poor physique and impaired health.

If the implications of the above four steps are closely examined, it will be seen how large is the task which Sir John Orr has set himself. He recognizes that the data at his disposal, particularly those based on an

* See, for example, H. D. Lamson, *Social Pathology in China.* Shanghai Commercial Press, 1935. Ch. viii.